**Amendments to the Specification**:

Please substitute the paragraphs below for the corresponding paragraphs pending in the application.

**[0058]** In accordance with an alternate embodiment of the present invention the light source unit illustrated in FIG. 1 may omit the spinning filter wheel assembly 15, 16, 19, 58. In this embodiment, an alternate detector unit is provided as illustrated in FIG.5. Incoming light 36 transmitted from the source unit of FIG. 1 and reflected by the reflection unit of FIG. 2 passes through window 35 that has similar characteristics to window of source unit illustrated in FIG. 1, and is reflected by a reflector 38, which directs the light beam 40 onto beam splitter/combiners 44,45 which direct portions 46,47 of the light to the spectrometers 43,42. Beam 49 passes from splitter/combiner 44 to 45. The rest of the light 61 is focused on spinning reflector 62. Reflector 62 is a single faceted flat mirror with a reflective surface that is optimized for the infrared light wavelengths of interest, such as an enhanced gold reflective surface or other suitable reflective surface. Alternatively, a multifaceted spinning mirror may be used, however the geometry of the rest of the layout would have to be modified from what is illustrated in FIG. 5. The spinning reflector 62 splays the light in sequence around a stationary array of filters 52,53,54 and gas cells 70 by directing the beam 64 into the side of monolithic ellipsoidal mirror 80 which reflects the light 66 into the array, consistent with the splaying of the light. After passing through each stationary band pass filter 52,53,54 and gas cell 70, the light beam 72 is redirected to and focused on single infrared detector 50 by a reflector 74 such as a spherical mirror. The reflective surfaces of reflectors 80 and 74 are optimized for the wavelengths of interest in the same way as the surface of spinning reflector 62. The single infrared detector sees a sequence of pulses of light 76 that are essentially the same as those illustrated as FIG. 3 item 48. Each filter 52,53,54 of this array substantially limits the passage of light to a predetermined spectral wavelength or range of wavelengths. Some filter center wave specifications are listed in Table 1. Each gas cell 70 of

this array substantially limits the passage of light of a particular spectral pattern of wavelengths absorbed by the known concentration of the gas of interest that the cell 70 contains.

**[0060]** It is instructive to refer to the illustration of FIG. 8 to further the understanding on why an ellipsoidal mirror (FIG. 5 item 80) is chosen to distribute light. An ellipsoidal mirror 200 has two focal points or foci 206,208. Such mirrors have the property that all light rays 202, <u>from a source 204,</u> diverging from a small spot near one focal point 206 are reflected in such a way that those rays 210 are again focused into a small spot near the other focal point 208 of the mirror 200. Given the unique layout of the alternative embodiment of FIG. 5, and commensurate need for a dual foci reflective device for light distribution through a full 360° of rotation of the spinning reflector (FIG. 5 item62), an ellipsoidal mirror is the bet choice for this alternative embodiment.

**[0082]** Returning to FIG. 10, a beam of light travels along an optical path 128, 132, 134, and 138 from the light source 120, to the first reflector 130, to the reflection unit 124, to the second reflector 136, to the detection unit 90. In this embodiment, the system also includes, as seen in FIG. 13, one or more additional light sources 144, 146, each capable of emitting a beam of light 148, 152 having known emission intensities corresponding to one or more of infrared, visible, and ultraviolet spectra, as well as one or more beam splitter/combiners 140,142, if necessary, positioned to direct beams 148,152 from the additional light sources 144,146 along essentially the same optical path 154, 132, 134 and 138 as illustrated in FIG. 10. <u>A beam of light from splitter/combiner 140 can follow optical path 150 to splitter/combiner 142.</u> The beam splitter/combiners 140,142 may be neutral density filters, or alternatively they may be wavelength sensitive beam splitter/combiners, such as dichroic beam splitter/combiners.

**[0083]** In another embodiment, illustrated by FIG. 14, the light sources 10,12, beam splitter/combiners 140,160, infrared detector 50, and spectrometer 43 are positioned so that ultraviolet light beam 212 from source 12 is traveling along essentially the same optical path, but in the opposite direction from infrared light beam 14 from source 10. This innovation is referred to herein as "opposed sources". An embodiment using opposed sources may eliminate the need for additional expensive, light attenuating components. For instance, if ultraviolet light 212 is directed towards, instead of away from, the infrared detector 50, the signal from the infrared detector 50 can degrade. If light 212 from an ultraviolet source 12 is traveling in the opposite direction <u>(optical path 132,134)</u> from the light 14 emanating from the infrared source 10 <u>(optical path 216,214)</u>, the ultraviolet light 212 is naturally kept away from the infrared detector 50 without the use of additional wavelength dependent filters or beam splitter/combiners. Light sources 12, 10 and detectors 43, 50 need to be matched with optical components of corresponding F-numbers for efficient light transmission. An embodiment using opposed sources, and first and second reflectors 130,136 of significantly different F-number, allows the sources or detectors requiring a higher F-number to be matched with the reflector with the higher F-number, and the sources and detectors requiring a lower F-number to be matched with the reflector with the lower F-number. This eliminates the need for additional optical components for F-number matching. Finally, opposed sources may significantly simplify component layout and reduction of thermal and electrical interference among components.